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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,081	01/25/2002	Aaron Fiala	FGT 1622 PA	5142

7590 05/01/2003

Steven W. Hays
Artz & Artz, P.C.
Suite 250
28333 Telegraph Road
Southfield, MI 48034

EXAMINER	
CULBERT, ROBERTS P	
ART UNIT	PAPER NUMBER
1763	6

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-6

Office Action Summary	Application No.	Applicant(s)	
	10/057,081	FIALA ET AL.	
	Examiner	Art Unit	
	Roberts Culbert	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 8-34 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

2. The indicated allowability of claims 9-15, 17-21, 24, 26-30, and 32 is withdrawn in view of the newly discovered reference(s) to Kohler and Mahoney. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8-21, 23, 25-31, 33, and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,902,535 to Garg et al in view of Japanese Patent No. 361035868 A to Tate et al, U.S. Patent 5,458,927 to Malaczynski, and U.S. Patent 5,783,261 to Potter et al.

Garg et al. teaches the formation of hard silicon-doped carbon coatings on titanium substrates with a noble metal interlayer. Refer to Abstract and Example No. 19. Garg teaches the cleaning of the substrate using argon gas (Col. 15, Lines 25-29). Garg also shows the formation of hard carbon-silicon coatings on titanium substrates using silane and methane gas (Col. 15, Lines 28-31). Garg does not teach preparation of the surface for treatment by cleaning with soap and water or solvent. Garg does not teach the application of hard-carbon coatings to aluminum surfaces or to bell cups.

Malaczynski shows that a hard-carbon coating may be applied to an aluminum workpiece to provide a scuff and wear resistant surface. See Background of Invention. Japanese Patent No.

361035868 A to Tate teaches that it is known to treat the aluminum surface of a rotary bell-cup in order to improve abrasion resistance.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the carbon coating titanium treatment method of Garg to aluminum or titanium bell cups in order to improve wear-resistance as suggested by Malaczynski and Tate.

4. Official Notice is taken that the steps of cleaning or degreasing a metallic surface as well as the steps of removing the native oxide layers typically formed thereon are notoriously old and well known in the art of forming coatings on metals. Evidence that the steps are known in the art is provided in U.S. Patent 5,783,261 to Potter et al, and U.S. Patent 5,458,927 to Malaczynski et al. Potter shows the use of soap, water, nitric acid, and alcohol for degreasing a metal surface prior to application of a hard coating (Col. 3, Lines 60-65). Malaczynski shows the use of argon bombardment to remove the native oxide layer from an aluminum surface prior to application of a silicon carbide layer (Col. 2, Lines 23-34)

It would have been obvious to one of ordinary skill in the art at the time of invention to prepare the surface by cleaning with soap and water or with an appropriate solvent such as acetone, alcohol, water, or to remove the native oxide layer with argon gas in the well-known manner.

Official Notice is taken that the steps of rinsing and drying are old and well known in the art for the purpose of preparing a metal surface. It would have been obvious to one of ordinary skill in the art at the time of invention to use the common preparation steps in order to provide a coating that is adherent, uniform and free from contamination.

Official Notice is taken that the limitation of using ultrasonic agitation is known in the art for the purpose of cleaning a metallic workpiece. It would have been obvious to one of ordinary skill in the art at the time of invention to use ultrasonic agitation in order to improve surface cleaning in the well-known manner.

5. Claims 24 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,902,535 to Garg et al in view of Japanese Patent No. 361035868 A to Tate et al, U.S. Patent 5,458,927 to Malaczynski, U.S. Patent 5,286,534 to Kohler and U.S. Patent 6,086,962 to Mahoney.

As applied above, Garg in view of Tate and Malaczynski discloses the method of the invention substantially as claimed, but does not show the use of tetramethylsilane as a source gas.

Kohler teaches a method for depositing hard carbon coatings that includes a feed gas with a carbon source such as methane (Col. 6, Line 52) and a silicon containing hydrocarbons such as tetramethylsilane (Col. 6, Line 58).

Mahoney teaches that hard silicon-doped carbon coatings may be formed using hydrocarbon compounds such as methane and silicon-containing compounds such as tetramethylsilane (Col. 8, line 61- Col. 9, lines).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the feed gas including methane and tetramethylsilane as the several silicon containing hydrocarbons are shown to be art recognized equivalents for the purpose of forming a silicon-doped carbon coating as shown in the Mahoney and Kohler references.

6. Claims 22 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,902,535 to Garg et al in view of Japanese Patent No. 361035868 A to Tate et al, U.S. Patent 5,458,927 to Malaczynski, U.S. Patent 4,919,773 to Naik.

As applied above, Garg in view of Tate and Naik disclose the method of the invention substantially as claimed, but do not teach the use of chromium as the interlayer noble metal.

Since Garg teaches the use of a noble metal interlayer, selection of chromium for this layer is obvious since Garg teaches that "noble metal' means only a non reactive metal (Col. 6, Lines 26-30). However, Naik teaches that chromium may be used as an interlayer between an erosion resistant layer and a titanium substrate. See Abstract and (Col. 3, Lines 48-51).

It would have been obvious to one of ordinary skill in the art at the time of invention to form the interlayer using chromium in order to provide a first layer capable of retaining substrate integrity and preventing diffusion from the second layer into the substrate as taught by Naik.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (703) 305-7965. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

April 28, 2003

BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER-1700